

Task and Schedule

- Two Tasks
 - Produce documentation needed for CD0 by end CY04
 - Start to build a community behind the PD
- Timeline for neutrino osc. working group
 - **October 6-9: Workshop:** Leave workshop with fixed table of contents and sections fully assigned to authors
 - **November 15:** Deadline for section authors
 - **December 3:** First draft
 - **December 17:** Final version
- Short timescale:
 - Explore options, but stay focused on the writing task
- Email distribution list:
 - `pd-oscillations@fnal.gov`
 - Send email to listserv.fnal.gov from your account with the subject blank and the body `subscribe pd-oscillations <firstname> <lastname>`

1) Intro, purpose, and explanation of chapter layout

2) Osc theory summary (Parke)

- a) Introduction
- b) Neutrino mixing: Three-flavor neutrino oscillations
- c) Matter effects
- d) Summary of current parameter knowledge
- e) Appearance and disappearance channels Including: which measurements are interesting:
 - i. θ_{13} ,
 - ii. CP measurements
 - iii. mass hierarchy
 - iv. deviations from max. Mixing
- f) Complementarity to reactor experiments
- g) What if MiniBOONE confirms LSND? -> Steriles, CPT violation ...
- h) Some other "new" physics possibilities

3) Theoretical motivation for neutrino oscillation measurements (Antusch, Lindner, Kersten, Ratz)

- a) Maybe some introduction about the generation of neutrino mass; Dirac/Majorana; see-saw
- b) Predictions from theoretical models (incl. GUTs, bottom-ups, anarchy etc)
 - i. θ_{13}
 - ii. Deviations from max. Mixing
 - iii. Mass schemes
 - iv. Maybe something about Dirac CP phase!?
 - v. Conclusion: Parameter predictions are within mid-term experimental reach
- c) Implications of RG running
 - i. Conclusions: zero θ_{13} and θ_{23} very close to maximal unlikely (with caveats)
- d) Impact of future measurements to model selection and theoretical predictions
 - i. Conclusion: Measurements help to select models or force theory to do it better

4) Where we may be in 10 years time

- a) Describe experiments that have yet to release results, but will have in 10 years time.
- b) Scenarios for where we may be in 10 years time
 - i. $\text{SIN}^2 2\theta_{13}$ greater than ~ 0.04
 - ii. $\text{SIN}^2 2\theta_{13}$ between ~ 0.01 and ~ 0.04
 - iii. $\text{SIN}^2 2\theta_{13}$ less than ~ 0.01
 - iv. LSND oscillation confirmed by MiniBooNE
 - v. $\text{SIN}^2 2\theta_{23}$ still consistent with 1
 - vi. Something unexpected

Draft Table of Contents

5) $\text{SIN}^2 2\theta_{13}$ Greater Than ~ 0.04

- a) Can use existing NuMI beamline
- b) Nova
- c) Other off-axis

6) $\text{SIN}^2 2\theta_{13}$ Between ~ 0.01 and ~ 0.04

- a) Need new beamline or larger detectors
- b) Super Nova
- c) FeHo
- d) Broadband scheme
- e) FNAL to China (de Jongh)

7) $\text{SIN}^2 2\theta_{13}$ Less Than ~ 0.01

- a) Search with experiments from previous chapter
- b) Betabeam (Finley and Jansson)
- c) Neutrino Factory (Geer)

8) Other Possibilities

- a) LSND oscillation confirmed by MiniBooNE
 - i. Decay at rest source (Van de Water)
 - ii. NUMI numu to nutau & numu disappearance (Bazarko)
 - iii.
- b) $\text{SIN}^2 2\theta_{23}$ still consistent with 1
 - i.
- c) Something unexpected
 - i.

9) Summary